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ABSTRACT

Defining speed listening as a technique allowing the listener to consciously determine the appropriate presentation rate for prerecorded materials consistent with personal objectives rather than with those of the original speaker, this paper reviews studies that support the use of speed reading in instructional settings. The paper examines research dealing with speed listening with special need learners, along with relevant studies on visual media, individualized instruction, independent study, and reading development. The studies reviewed cover the following topics: (1) the effect of simultaneous acceleration of both audio and visual stimuli on a simple motor skill task; (2) the comparative effectiveness of viewing video modules at a normal rate, compressed rate, and at a self-paced rate; (3) the effect on achievement of listening to course modules at a compressed rate; (4) the use of compressed speech tapes in a college independent laboratory study setting; (5) the incorporation of compressed speech into a dial access information retrieval system; and (6) the impact of compressed speech auditory pacing on reading speed and comprehension and listening skills with secondary school and college students. (FL)

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EXCEL

EXChange for Enrichment of Learning

Report:

COMPRESSED SPEECH TECHNOLOGY: APPLICATIONS FOR SPECIAL NEED LEARNERS

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COMPRESSED SPEECH TECHNOLOGY: APPLICATIONS FOR SPECIAL NEED LEARNERS

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COMPRESSED SPEECH TECHNOLOGY: APPLICATIONS FOR SPECIAL NEED LEARNERS

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ABSTRACT

For decades it has been known that man could think far more rapidly than he could speak. Until recently, it has not been possible to capitalize on this ability in the instructional setting. A new technology called compressed speech has now made it possible to alter the presentation rate of a pre-recorded passage without excessive distortion. The resulting instructional innovation - speed listening - has some promising applications for college and university teaching.

This work will review how speed listening has been employed in a variety of instructional settings including; applications with visual media, individualized instruction, independent study, and reading development. Interpretation of these reported findings, coupled with current research by this author, reveal that speed listening can be an invaluable saver of instructional time, may enhance the motivation and performance of students, and can provide an increased flexibility in educational programming at the higher education level. Although the scope of research in this area is somewhat limited, the potential power of speed listening as an instructional and skill development tool is emphasized and highlighted.

COMPRESSED SPEECH TECHNOLOGY: APPLICATIONS FOR SPECIAL NEED LEARNERS

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Since the orbiting of Sputnik I in 1957, technology's rapid growth has thrust our society into a period of escalating information expansion. Conservative estimates predict that mankind's acquired knowledge will literally double every ten years during the next half centry (States & Lien, 1974). Although the body of knowledge that an individual must master is growing quickly, the time that one has to accomplish the task remains forever constant. With only twenty-four hours in each day, mankind must continually seek more efficient ways of digesting the ever-increasing volumes of written and spoken information.

In its written form, new information can be reviewed by reading at a rate consistent with the reader's intention. One's reading rate may be varied from highly acclerated skimming and scanning to methodical and deliberate reading for detail and subtle nuances of meaning. With specialized training, reading speeds in excess of one thousand words per minute (wpm) have been successfully attained.

The same flexibility, however, has not been available with regard to the large amount of spoken information an individual encounters. In this format, the listener has little or no control over the rate at which the spoken information is presented. Since the average speaking rate is approximately 150 wpm, learning by listening would appear to be a grossly inefficient endeavor. This would be particularly true if the listener were limited to only original live spoken presentations. For decades technology has

allowed us the capability of recording and then replaying spoken material. Until recently, however, we have not been able to effectively alter the rate at which spoken information was presented.

In the seventies, the development of a new generation of affordable devices called speech compressors allowed for the variable acceleration or deceleration of prerecorded spoken material without excessive distortion. The evolution of this practical technological innovation has now opened the doors for serious inquiry into "speed listening" which this author defines as the technique whereby the listener consciously determines the appropriate presenatation rate for prerecorded materials consistent with his or her objectives rather than those of the original speaker.

Speed Listening Instructional Uses

Due to the recency in the evolution of this technology, research on the instructional applications of speed listening has been limited. Most early work was done with young or handicapped learners. These studies do, however, provide some valuable insights for the possible applications of the compressed speech technology to university teaching. For comparison purposes, these studies will be examined and reviewed together by type.

Combined Applications with Visuals

Some investigators concluded that the simultaneous acceleration of both audio and visual stimuli might result in improved learning. In a study by Dunathan, Masterson, Parks and Tharpe (1975), using normal sixth grade students, the audio track of an instructional Super 8 sound motion picture was compressed while the projector speed was adjusted to match the audio presentation rate. In a

simple motor skill task of building a boat these researchers found no loss in performance with compression rates up to fifty percent. Using compressed speech for the audio portion of video tapes, Ludrick (1974) force-paced two groups of twenty students through sixteen video taped modules at a normal (150 wpm) or a compressed (211 wpm) rate while two other groups were self-paced. Analysis showed no significant difference between groups but a trend toward higher levels of achievement was noted for the compressed speech treatment.

Both of these experiments suggested that the time required to present certain types of combined audio and visual instructional modules could be reduced through compression without a loss in levels of performance or achievement. These studies were also confronted with the technical problem of trying to alter both the audio and video presentations simultaneously. In the future this problem can be resolved by the use of the recently developed Panasonic Omnivision II VHS NV-8200 video cassette recorder which, among other things, has a variable speed video display feature. With this device the video/audio program can be presented at rates between one-fifth to twice normal speed. Further experimentation in this combined area of compression will now be possible with greater precision.

Compressed Speech and Individualized Instruction

In an attempt to demonstrate the usefulness of compressed speech in individualized instruction, Sarenpa (1971) studied a biology course taught by the Audio-Tutorial method. One group of twenty-nine students listened to the twenty-two modules at a normal speed while the other group heard the same lessons

precompressed to the 193-238 wpm range. Time spent on each module was recorded on a time clock handled by the student. There was no significant difference in achievement between groups using normal or speed tapes, but the compressed speech group did show a time savings.

In a different approach to individualization, Hass (1974) allowed students to listen to lecture tapes that were precompressed by fifty percent on a once a week basis. In the other classes students attended regular lectures or discussion groups. On the final examination students performed better on the questions based on the tapes than on questions based on the live lectures. Eighty-two percent of the 150 students involved stated that they would prefer a combination of compressed tapes, lecture, and discussion groups rather than all live lectures.

These studies tend to further confirm the benefits of speed listening as a saver of instructional time without sacrificing academic performance. The Hass investigation also suggests a possible student preference for at least partial exposure to the compressed speech format.

Speed Listening and Independent Study

Employing an independent study approach, Challis (1973) used college students enrolled in a basic audio-visual course to determine if compressed speech tapes could be effectively used in an independent laboratory study setting. The ninety-six students involved were divided into a control group, a group using tapes compressed by thirty percent, a group using tapes compressed by forty percent, and a group that could choose from six different rates of compression. There was no significant difference on achievement scores of the four groups and no significant difference between students with

high grade point averages and those with low grade point averages using the same rates of speed. Of those answering an attitude survey ninety-one percent expressed a favorable attitude toward compressed speech while seventy-one percent indicated that they would choose the thirty or forty percent compression for future use.

Primrose (1974) studied the feasibility of incorporating compressed speech into the dial access information retrieval system at Oral Roberts University. The tapes used were compressed at a progressively increasing rate throughout the semester. Students were given the choice of either listening to normal speed or compressed tapes for lecture or review. Although the experiment was not well controlled, it was concluded that there was no significant difference on grades received by students using either normal or compressed tapes. Over half of the students reported a preference for the speeded tapes with a greater interest being expressed by the high achieving group.

In an experiment conducted by Short (1975), a semester long college course which had been previously taught by self-paced audio-visual methods was presented to half the students by means of variable speech compression while the other half listened to the identical recording at normal speed. It was reported that of those in the speed listening group seventy percent adapted quickly and preferred the faster than normal rates. Forty percent of these students regularly selected to listen at a rate approximately twice that of normal speed. In addition to confirming substantial savings in instructional time, Short also reported significantly higher scores on the achievement tests for those using the speech compressor.

Nath (1978) also demonstrated the usefulness and efficiency of compressed speech in a study of this technique in continuing education programs for practicing pharmacists. Using seventy-three pharmacists from Alabama and Georgia, he concluded that professionals in this field could successfully comprehend compression rates of up to seventy-five percent but observed that acceptance of the compression technique deteriorated beyond the fifty percent rate.

These findings in the independent study area also substantiate the beneficial impact of speed listening in a variety of settings. Further evidence to support a student preference for moderate compression is again noted. Short's experiment presents statistically significant results which demonstrate superior performance for those using speed listening. Although trends in this direction were reported in earlier studies, this was the first strong confirmation under well controlled experimental conditions.

Compressed Speech and Reading Instruction

Another area in which compressed speech may prove to be valuable is in the improvement of reading skills. It is an accepted fact that reading rate, in particular, can be positively affected by progressively accelerated external pacing. This pacing is typically provided visually with electronic or mechanical reading machines of skimmers. Several investigators have speculated that compressed speech might provide a useful alternate external pacing technique.

Early work on this notion was conducted by Orr (1964 & 1966) who first reported that using rapidly presented auditory material to pace reading resulted in significant increases in reading speed without loss in reading comprehension. Reiland (1970), using sixth grade students, reported contrary findings. In her study

she found no significant difference when progressive auditory pacing supplemented silent reading. Johnson (1971), while working with fourth grade students, confirmed Reiland's non-significant results. This investigator cautioned, however, that the non-benefical effects may be a function of the learner's age and stage of human development. Credence to this observation was provided by Thames and Rossiter (1972) when they examined the effect of progressive compressed speech auditory pacing on forty-six high school sophomores of average ability. Using this age group they found significant increases in reading rate without loss in reading comprehension in as few as ten practice sessions of thirty minute duration. Musial and Maple (1975), using eighth graders, reported a positive but non-significant trend in favor of the auditory pacing approach. This study was, however, fundamentally different from those previously reported in that a constant rather than a progressively accelerating auditory pacing technique was used.

A study by Winters (1975) further documented the fact that the impact of the compressed speech auditory pacing technique was of different value to various types of learners. This study reported that the reading comprehension of seventh grade learning disabled students with reading difficulties was positively affected by listening to passages with compresssed speech. The benefit of the auditory pacing technique with students of low reading ability was further suggested by Shennum (1975). Using twenty-six adult navy training recruits, he reported a significant reading rate gain with an associated twenty percent gain in reading comprehension for the progressive auditory pacing experimental group.

Pierce (1978) presented evidence that for normal ability students, the junior high school years appeared to be the developmental stage at which the beneficial effects of auditory pacing began to be consistently manifested. In this experiment, he demonstrated significant gains in reading rate while simultaneously maintaining reading comprehension proficiency.

These studies once again demonstrate the potential positive impact of speed listening when applied in the proper setting with appropriate students. These findings suggest that external pacing using compressed speech is an effective technique for improving reading rate in adult learners.

This author (Sullivan, 1981) conducted an experimental comparison of the relative effectiveness of visual and compressed speech auditory pacing in the reading rate, reading comprehension, and listening skills development of university students. In this study adult university students were randomly divided into two experimental and one control group. The only difference between the two experimental groups was the manner in which they were paced through their structured six week reading development program. One experimental group was paced visually using traditional reading machines. The other received auditory pacing using audio tapes specifically compressed to mirror the progressive rate increase scheme used by the visual paced group. The control group was involved in skill development programs which involved no externally paced reading instruction. The auditory pacing technique resulted in reading comprehension and reading rate gains that were comparible to those made with the traditional visually paced group.

The auditory paced group was, however, superior to all others on measures associated with the learner's ability to listen to and comprehend spoken material presented at normal and highly compressed speeds. This research suggested that speech compressed may produce both reading and listening skill improvements with normal adult learners.

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